

MINUTES

CALIFORNIA TRAFFIC CONTROL DEVICES COMMITTEE MEETING OF FEBRUARY 17, 1993

The first meeting of the CTCDC in 1993 was held in the auditorium of the Caltrans District Office, 2829 Juan Street, San Diego on Wednesday, February 17, 1993.

Chairman Mike Howard opened the meeting at 9:03 a.m. with the introduction of members and guests. The Chairman thanked Caltrans for its hospitality.

The following members, alternates, and guests were in attendance:

ATTENDEES	ORGANIZATION	TELEPHONE
Members (Voting)		
Mike Howard Chairman	California Highway Patrol, Sacramento	(916) 657-7222
Dick Folkers Vice-Chairman	League of California Cities, Palm Desert	(619) 346-0611
Roger Burger	County Supervisors Association of California, Alhambra	(818) 458-4014
Bruce Carter	County Supervisors Association of California, Redding	(916) 225-5661
Gary Foxen	Auto Club of Southern California, Los Angeles	(213) 741-4429
Perry Lowden	California Department of Transportation, Sacramento	(916) 654-4551
Harold Rosenberg	League of California Cities, Chula Vista	(619) 691-5116
Russ Taft	California State Automobile Association, San Francisco	(415) 565-2304
Jack Kletzman Secretary	California Department of Transportation, Sacramento	(916) 654-4715

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ATTENDEES	ORGANIZATION	TELEPHONE
R. C. Anderson	RCA Technology	(619) 685-7151
Rod Amundson	3M Co.	(916) 924-9605 Bryce
Bent	Bent Mfg.	(310) 638-5141
Bob Brow	County of Sacramento	(916) 366-2227
Bob Carlson	City of Escondido	(619) 741-4651
Jim Draper	Flex-o-Lite	(800) 637-3306
Stan Doidge	Potters Industries Inc.	(818) 814-8334
Robert Donner	Caltrans HQ	(916) 654-4949
Mark Fernandez	Flex-o-Lite	(800) 637-3306
Julio Fuentes	City of San Diego	(619) 533-3956
Fred Jager	Caltrans HQ	(916) 654-5528
Bob Johnson	Allied Barricade	(619) 442-4401
W. E. Joltneson	Econolite	(714) 630-3700
Brent Kulp	Traffix Devices	(714) 361-5663
Lanny Hyde	MQ 1	(707) 965-2714
Larry Hurt	County of San Diego	(619) 694-2241
E. Lopez	City of San Diego	(619) 236-7719
Conrad Lapinski	City of Irvine	(714) 724-7365
Ron Miller	City of Escondido	(619) 741-4651
Walter Milligan	Flasher Barricade Assoc.	(619) 286-9700
Jack Navone	Brite Line Industries	(209) 367-1434
Jim Otterson	City of Hunting Beach	(714) 536-5523
Joe Peca	City of Hunting Beach	(714) 536-5428
Tony Rabe	Pacific Bell	(916) 972-4173
David Royer	City of Los Angeles	(213) 485-3548
Luis Sandoval	City of San Diego	(619) 236-6033
Jeanifer Sansare	SDG & E	(619) 654-1104 Jim
Sherman	City of Los Angeles	(213) 485-6193
Marti Sjohom	Allied Barricade	(619) 442-4401
Warren Wetterlund	Flasher Barricade Assoc.	(619) 286-9700
O. C. White Jr.	City of Fresno	(209) 498-1436
Robert Zeigler	County of Marin	(415) 499-6336

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ELECTIONS

In an unanimous decision, Chairman Howard and Vice-Chairman Folkers were re-elected by the Committee to a second year of office.

PRODUCT DEVELOPMENT

Chairman Howard told the audience that it was inappropriate for the Committee to endorse any individual product . While the development of new products is encouraged by the Committee, developers and manufactures are now required to be represented by local or state agencies wanting to test the new device.

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MOTION: By Perry Lowden, second by Bruce Carter, to adopt the minutes of the Monterey meeting held on September 24, 1992.

Motion carried 8-0.

89-9 EMERGENCY VEHICLE APPROACHING SIGN

Dick Folkers said that, the test signs are expected to be operational by March 1, 1993. The test sites will be in the City of Sacramento; on I Street, at 12th and 13th Streets; and on Del Paso Boulevard at Arden Way. He recommended the item be continued. Mr. Anderson said the test would last for six months.

ACTION: Item continued.

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90-9 YEAR ROUND SCHOOL SIGNING

Russ Taft, acting at the direction of the Committee, contacted the City of Fresno to elicit whatever statistical data could be established from their experience with all year school signs. Taft also contacted the City of Incline Village and Orange County in Florida and neither had all year signing.

Mr. O. C. White, representing the City of Fresno, said that in 1987, the Fresno City Council ordered the City Traffic Engineer to install all year school signs at several locations for schools that had just converted to all year operation. No testing of the sign's effectiveness was planned.

In order to assist the Committee, Mr. White and his staff researched police citation records for schools with similar traffic characteristics. Records indicated about the same number of citations for the all year schools and traditional schools. The first year after all year signs were erected and an enforcement program was initiated, citations for all year schools went down approximately three to one. Data from succeeding years indicated a less dramatic reduction in citations. Calls for enforcement at all year schools were reduced in each of the last four years.

The City of Fresno has approximately 30% all year schools. About half of the schools are in 25 m.p.h. zones. The study was done in predominantly 45 m.p.h. zones. The all year plate is used with WHEN CHILDREN ARE PRESENT signs (R72), school symbol signs (W63), and school crossing signs (W66).

Russ Taft believes the sign has merit and is needed where there is a mix of nine month and all year schools. Taft feels the WHEN CHILDREN ARE PRESENT sign does not provide sufficient advanced warning. Bob Brow of Sacramento County expressed concern that poor communications with county school districts would lead to improper signing, and a subsequent increased exposure to litigation. Brow questioned the validity of the study, because it was an after the fact study, based only on citation records. He suggested more studies before local agencies are exposed to the potential liability.

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90-9 YEAR ROUND SCHOOL SIGNING (continued)

Bruce Carter felt the study was unscientific because no correlation was established between citations and the sign's effectiveness. Taft suggested that traffic speeds could be recorded during summer, in the school vicinity, and again after signs are erected at newly converted all year schools. Carter said that any change is effective. The public will notice and react to change, but the reaction diminishes as time passes. Roger Burger agreed with Carter in questioning the validity of the study because of the undefined cause of the number of citations. Burger recommended a radar speed and accident study, before and after signs are erected.

Harold Rosenberg asked if the problem occurs solely on the streets where the speed zone is 25 m.p.h. Rosenberg feels the WHEN CHILDREN ARE PRESENT is applicable throughout the year and asked if the all year sign is only needed where the existing standard can't be used. Russ Taft remained concerned that motorists, traveling at high speeds, are not prepared to react by the time they see children. Gary Foxen pointed out that the school sign package allows the WHEN CHILDREN ARE PRESENT sign to be placed 600' in advance of the school grounds. Foxen was concerned that any study would not be able to measure driver alertness. The consensus of the local agencies representatives in the audience did not favor further tests.

Chairman Howard thanked Mr. White for his presentation and the City's effort. The scope of research was necessarily limited by the available data, and the parameters under which he worked were understood. Bruce Carter asked if the signs would remain if the Committee rejected the sign. Mr. White said he would recommend that the signs be removed, but that authority rested with the City Council.

MOTION: By Russ Taft, second by Bruce Carter, not to take any action.

Motion carried 8-0.

ACTION: Item completed.

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91-7 LIGHT RAIL ALTERNATE FLASHING RED SIGNAL

Russ Taft asked that the item be continued because the Light Rail Safety Subcommittee is scheduled to meet on March 19, 1993.

ACTION: Item continued.

92-13 POLICE OR SHERIFF'S FACILITY SIGN

Dick Folkers asked that the item be continued because he has not yet received a response from the Chiefs of Police for California.

ACTION: Item continued.

92-17 NATURAL GAS SIGN

Perry Lowden said he met with Mr. Leo Thomason from the California Natural Gas Vehicle Coalition, and Mr. Dennis Winger of the California Energy Commission. The Energy Commission supported by gas companies favor a natural gas sign. Lowden proposed signing to natural gas facilities that were at regular public gas stations. The fuel signs for methanol, diesel, and other alternative fuels are signed in that fashion. Since most of the facilities will be in urban areas, a deviation from the existing policy of not signing for regular gas in urban areas is necessary. The same criteria was used for Methanol. Lowden recommend using a gas pump sign with a natural gas plate and eliminate the "NG" from the current proposal. These proposals are acceptable to the other principals at the meeting.

Gary Foxen asked about the use of CNG (compressed natural gas.) Ms. Jennifer Sansare representing SDG & E said the industry is moving away from the CNG designation and that on a national scale, natural gas was more generic.

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92-17 NATURAL GAS SIGN (continued)

David Royer representing the City of Los Angeles established that the sign would be limited to approximately the same distance as other alternative fuels from the State Highway. Local agencies prefer to limit the distance in which they have to carry the signing.

MOTION: By Perry Lowden, second by Russ Taft, to adopt a fuel pump symbol with a natural gas plate for public gas stations that dispenses natural gas.

Motion carried 8-0.

ACTION: Item completed.

92-18 GOLF CART SYMBOL SIGN

Dick Folkers presented the Committee with a black and white and a green and white symbol signs for golf carts, together with their educational plates. The black and white sign is used on streets where golf cart lanes are striped and the green and white sign is used in locations where there is no golf cart lane striping. Folkers also presented a GOLF CARTS MAY USE SIDEWALKS sign for use where the City required an 8' wide sidewalk, in the absence of any road, to connect golf courses.

Folkers exhibited a videotape which explained the City of Palm Deserts electric golf cart transportation program. The film said that golf carts are environmentally cleaner and cheaper to drive. The cost is approximately 4¢ to 5¢ per mile. Electric carts can be charged at one of the city's specially designed parking lots. Minimum modifications for golf carts to meet the code include, brake lights, turn signals, and rear and side view mirrors. If the carts meet the code and are inspected, drivers may obtain a two year driving permit.

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92-18 GOLF CART SYMBOL SIGN (continued)

Folkers said there was a fee for the inspection and certificate, but at this time there is no fee for the electric cart charge. The FHWA considers this to be an experimental program. Folkers said that seat belts are required and is proposing the use of standard green for the sign. When the use of sidewalks is allowed, only signs will be used and lanes will not be striped. Bicycles can use golf cart lanes but golf carts cannot use bicycle lanes.

ACTION: Item continued.

**93-1 TRAFFIC ISLANDS, EFFECT OF MODIFICATION
FOR DISABLED ON THE VISUALLY IMPAIRED**

Harold Rosenberg requested the item be continued. Rosenberg explained the problem was that islands constructed across pedestrian crosswalks with a slot cut through the island to accommodate disabled pedestrians, confuses seeing eye dogs used by the visually impaired. The seeing eye dogs resist crossing the apparent barrier. Rosenberg has used tactile strips to provide a rough surface so that the visually impaired can feel the difference in texture on the pavement. He considers this application a roadway design feature and not a traffic control device. Dick Folkers agreed with Rosenberg. Roger Burger said the American Disabilities Act which just went into effect, does not recognize grooves. This act requires the use of a truncated dome, which is a small heavy duty plastic Bot dot about the size of a quarter. Perry Lowden said that all design features concerning disabled facilities are under the purview of the Department of Architecture.

MOTION: By Harold Rosenberg, second by Dick Folkers to have the Secretary notify Ms. Meadow Fitzgerald of the consensus of the Committee. Motion carried 8-0.

ACTION: Item completed.

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93-2 L.E.D. STUDY BY CALTRANS

Bob Donner from Caltrans described a District 6 (Fresno) pilot study, using 12" red LED signal faces. This was done on one red indication and with incandescent lamps left on the other faces at specific intersections. After operating under normal traffic conditions for about a year, there was no discernible difference between the LED faces and the incandescent faces. It's possible to identify the LED faces if one were close enough to see the individual LED devices. From 50' away the LED devices blended together and looked identical both in color and intensity. Photometric distribution tests of the LED faces indicate that ITE National Standards are not met everywhere. There are 8 to 10 spots which are slightly deficient. Visually this is indiscernible. Donner suspects that a 12" head, using a 150 Watt incandescent lamp will also fail to meet the ITE distribution. An 8" head, using a 67 Watt incandescent lamp did not meet ITE distribution. Because of these deficiencies, Caltrans uses a 850 lumen lamp.

Caltrans intends to install approximately 1900 red indications around the District. 8" and 12" signal faces and some 12" arrows will be studied. The advantage is that LEDs use only about 25% of the power needed for an incandescent face. LEDs have a life expectancy of 10 years.

Savings in energy costs alone would pay for purchase and installation of red LEDs in two years. This does not take into account the additional savings from maintenance and group replacement of incandescent lamps. Caltrans normally group replaces their lamps at signalized intersections annually, in order to prevent dark faces from early burnouts. It is expected that red LED indications would allow group replacement to be extended to 5 years minimum. Donner requested an experimentation sanction from the Committee.

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93-2 L.E.D. STUDY BY CALTRANS (continued)

Russ Taft questioned whether the experiment should be expanded in color and application. Mike Howard reminded the Committee that the City of San Jose has an existing sanction for a similar experiment. Bob Donner said that no manufacturer has yet developed an amber or green LED face that is acceptable. LEDs naturally emit in the red spectrum. Other colors are developed by doping the junction with a mixture of colors.

J.R. Lopez of the City of San Diego said the signal indication is a blue green and the blue LED cost is prohibitive. He was concerned about signals used for ramp metering and requested a standard for color, intensity, and cone of visibility. Donner said the study was limited to signalized intersections and does not include ramp metering.

Harold Rosenberg said he was in favor of the experimentation but requested an application be made describing the objective and listing the controls and method of analysis.

Gary Foxen pointed out that LEDs provide a sharper red arrow by eliminating the halo effect produced by incandescent lamps. Donner said that the reason Caltrans testing is limited to red indications is that the industry is starting to develop in this area. There are a number of manufacturers that are ready to distribute signal faces. Other indications such as hand symbols are still in the experimental phase.

MOTION: By Dick Folkers, second by Bruce Carter to sanction experimentation . AMENDED: By Bruce Carter, second by Russ Taft that the approval be subject to submission of an application describing the purpose and method of experimentation.

Motion carried as amended 8-0.

ACTION: Application for testing granted. Item continued.

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93-3 BIKE LANE DELINEATION REVISION

Perry Lowden explained that the Traffic Manual (Figure 6-25 "Bike Lane Signing and Markings") shows that an optional dash is permitted in the last 200'. The California Bicycle Advisory Committee has recommended that this distance be reduced to 100' because some blocks are shorter than 200'. The Vehicle code says that drivers can encroach on the bicycle lane within 200' of the intersection. Mike Howard was concerned that regardless of how it is striped, the motorist could still legally enter the bike lane at 200'. The motorist might be cited for failure to obey roadway markings and have it on his driving record, when in fact he can legitimately be in that lane.

Russ Taft said a motorist will interpret a dashed line to signify its allowable to cross, and a solid line, especially a wide solid line, to mean don't cross. Harold Rosenberg said the Vehicle Code stipulates that you cannot drive in a bike lane but it does allow crossing a solid white line. Rosenberg recommends indicating to the motorist where he is to drive when approaching an intersection and turns right. He is in favor of dropping the solid line because it may be misconstrued by either the motorist or the police officer. Gary Foxen explained the Bicycle Committee is concerned that requiring a 200' broken line, in the case of a short block, can cause the entire line to be dashed.

Dave Royer said that the City of Los Angeles requested the reduction because they wanted the traffic engineer have discretion to determine the appropriate distance for the right turn pocket. In the case of a shared lane with parked cars, 200' becomes prohibitive because a 300' block precludes parking. Royer recommended that the wording in the Vehicle Code [Section 21209 (3)] be revised.

MOTION: By Gary Foxen, second by Dick Folkers, to refer the matter back to the California Bicycle Advisory Committee to evaluate conflict with, or revision of the Vehicle Code to allow their recommended striping pattern. Motion carried 8-0.

ACTION: Item continued.

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93-4 CONVEX MIRRORS

Bruce Carter noted that this device was discussed by the Committee under Light Rail Alternate Flashing Red Signals (Item 91-7) and asked the Committee if it cared to discuss establishing standards for using convex mirrors. Carter acknowledged that this was not a traffic device, but wanted to use one and elected not to, because of the potential liability due to a lack of standards of application. Carter knows that other local agencies have employed them, it is sometimes the only solution, and he has been asked by others to seek standard usage.

Harold Rosenberg recalled that this item had come been discussed by the Committee and asked the Secretary to research the matter. Rosenberg's recollection was that the image was so distorted that judgment of the position of another vehicle was undependable and it became a liability risk. The item was dismissed as a non traffic control device.

Russ Taft said that the City of San Francisco is considering using mirrors as a traffic control device by erecting signs that say LEFT TURN MUST USE MIRROR. The Light Rail Committee is considering convex mirrors because motorist's rear view mirrors do not appear to have sufficient scope to show the track when making a left turn. Convex mirrors are low cost, they don't provide very much depth perception, but they can alert the motorist that something is there.

Gary Foxen said that these are not traffic control devices because they do not warn, regulate, or guide traffic. Foxen feels that these devices can not properly be used without a great deal of experience. Although there are some locations where there is no alternative to this gadget, they are a poor substitute for resolving the real visibility problem. Carter noted that, if they are being used, there ought to be some guidance.

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93-4 CONVEX MIRRORS (continued)

Larry Hurt from the County of San Diego wanted to speak against the device citing distortion of distances, unfamiliarity of the driver, vandalism in rural areas by shooting, moisture conditions which cloud mirrors, sand blasting, and requested that the Committee not adopt any standard. Hurt said these mirrors should not be compared to the convex mirror in cars because the driver maintains the car mirror, but would not maintain the device on the road.

Dick Folkers said he is aware of special situations where this device is necessary. There are everyday cases where it does work.

MOTION: By Russ Taft, second by Perry Lowden, continue the item subject to discussion by the Light Rail Committee. Motion carried 7-1.

ACTION: Item continued.

**93-5 BIKEWAY DELINEATION ACROSS
FREEWAY RAMPS**

Perry Lowden explained that the County of Sacramento requested striping bike lanes on crossing streets across freeway ramps. This issue has been brought before the California Bicycle Advisory Committee and the purpose of bringing it before the Committee was to table the item.

Jim Otterson of the City of Hunting Beach is opposed to this type of delineation. Otterson explained that his city has a large bicycle population and he is concerned about the false sense of security from bicycle lanes. He would prefer that the cyclist would be better served if he were aware that the lane was ending and that he had best check for traffic coming from the left. Gary Foxen said that this was also the conclusion of the Bicycle Advisory Committee.

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**93-5 BIKEWAY DELINEATION ACROSS
FREEWAY RAMPS (continued)**

Bob Brow of the County of Sacramento said that the County was trying to resolve a conflict between allowing dashed lines through intersections and not through freeway ramps. Harold Rosenberg responded that there was a difference in the speed between intersections and that of approaching an on-ramp of a major facility.

MOTION: By Perry Lowden, second by Russ Taft, to table this item subject to advice from the Bicycle Advisory Committee.
Motion carried 8-0.

ACTION: Item tabled.

93-6 BIKE LANE QUEUING AREA DELINEATION

Perry Lowden said this item was brought up by the City of San Luis Obispo and they now wish to withdraw it.

MOTION: By Perry Lowden, second by Bruce Carter, to delete this item.
Motion carried 8-0.

ACTION: Item deleted.

93-7 CHANNELIZER PLASTIC DRUM

Perry Lowden proposed that drums be allowed in California. Lowden acknowledged that the Traffic Manual specifically shows a used oil drum as an unacceptable device, but the device that he is recommending is a nationally used plastic drum. He characterized the device as an oversized channelizer. The proposed device is made of soft plastic, it crushes when struck and doesn't bounce, and it provides added delineation.

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93-7 CHANNELIZER PLASTIC DRUM (continued)

Russ Taft was concerned that the drum might act as a projectile. The device Lowden examined was fabricated in two segments. The cone crushed and the heavier base was driven over at 50 m.p.h. with no adverse effect. Jim Draper representing Flex-o-Lite, said that there are many versions of drums, but most states are using the two piece drum with a flat side to reduce movement. The low density plastic drum separates from the weighted base. Mike Howard established that there are multiple manufacturers of flat sided drums. Gary Foxen pointed out that the drums were as stable as existing delineators. Taft said that motorists have a tendency to not hit things that are a threat to them and that is in favor of the drum, but that he advocates the two piece drum. Harold Rosenberg cited the successful use by the City of San Diego of a drum to protect a center island far side signal pole located on a road with poor curvature.

Bruce Carter read Part 6 of the new Federal National Manual to the Committee.

"Drum Design. Drums used for traffic warning or channelization shall be constructed of light weight deformable materials and be a minimum of 36" in height and have at least a 18" minimum width regardless of orientation. Steel drums shall not be used. The markings on drums shall be horizontal circumferential alternating orange and white retroreflectorized stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes. Any non-retroreflectorized spaces between the horizontal orange and white stripes shall not exceed 2" wide. Drums shall have closed tops which will not allow collection of construction or other debris."

In response to questions from the audience, it was established that the device would be used for delineation and not as an attenuator, and that the spacing would be the same as for cones. Jim Draper said most states are using low density plastic because of the advantage of having the drum collapse and some states were conferring rubber bases instead of sand filled bases. Lowden said the drum is an option and would not be a replacement for cones and delineators because of economics.

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93-7 CHANNELIZER PLASTIC DRUM (continued)

Russ Taft requested consideration of a two piece device. Brent Kulp of Traffix Devices, said that the one piece device is stabilized with external sand bags and has no break away point. Kulp said all other manufactures have a two piece design and the new Federal Manual is eliminating the one piece device. Roger Burger agreed with Taft, saying the two piece design is essential.

MOTION: By Perry Lowden, second by Dick Folkers, to adopt the Federal specifications for drums as an allowable alternate for channelizers on construction sites. AMENDMENT: By Russ Taft, Second by Perry Lowden, to require a two piece drum.

Motion carried as amended 8-0.

ACTION: Item completed.

OFF AGENDA ITEMS

Dick Folkers said that Mexico has a blinking green light used as a warning phase and asked that this be brought up at the next meeting. Bob Donner said that Delaware has an experiment with a flashing green light used to allow motorists to proceed with caution. Motorists can enter an intersection with an opposing green light in the other direction. Folkers asked the Secretary to place the item on the agenda.

Harold Rosenberg said there is a proposal by the FHWA recommending centerline striping shall be placed on all paved roadways, in rural districts, on all two-way roadways, 18' or more in width, when the prevailing off-peak 85 percentile speed or posted speed limit, whichever is higher, is 35 m.p.h. or greater. In addition the centerline stripes will be in residence or business districts on all through highways with an ADT of 1550 cars or greater and on other streets when the ADT is 500 cars or greater.

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OFF AGENDA ITEMS (continued)

Rosenberg said in urban areas almost every street would be required to have centerline striping because it only takes 50 homes to produce 500 cars. The Striping Committee has a more reasonable proposal. It says, centerline striping shall be placed on all paved roadways, in rural districts, on all two-way roadways, 18' or more in width, with an ADT of 1000 cars or greater, and in residence or business districts on all through highways with a traveled way of 20' or more in width, with an ADT of 5000 cars or greater. Rosenberg wrote a letter to the chairman protesting the FHWA proposal and asked that others write in protest. Chairman Howard encouraged this response. Perry Lowden said it was published in the register and the protests were sufficient to kill it but he too encouraged everyone to respond. Rosenberg later asked that it be put on the agenda.

David Royer of the City of Los Angeles said the FHWA is looking at what is termed a strong green and strong yellow. They have been encouraging local agencies to experiment with the colors. Royer feels the color may have merit. It appears better than the orange-yellow now in use. The proposal would be to experiment with the new colors on warning signs for pedestrian crossings, school crossings, and bicycle crossings. Royer said lime yellow might be the most visible color in the spectrum and may make the most visible sign. If this proves to be the case FHWA will seriously consider going away from the orange-yellow spectrum to the lime-yellow spectrum. Application will be made through the FHWA. Royer said he would like this brought up as an agenda item. Gary Foxen agreed.

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OFF AGENDA ITEMS (continued)

Perry Lowden announced that Chapter 10 of the Traffic Manual needed to be reprinted and that minor corrections will be made before publication. Chapter 4 will also be updated to include changes recommended by the Committee over the past 6 years. He requested any changes be submitted by March 15th.

Perry Lowden said that someone asked about the Committee's feelings toward using a 6" wide edge line. Lowden said this wider edge line was already allowed and need not come before the Committee.

ADJOURNMENT

MOTION: By Gary Folkers, second by Russ Taft, for adjournment.

Motion carried 8-0. The meeting was adjourned at 12:32 PM.